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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,725	02/07/2002	Yu-Chih Cheng	PMXP0132USA	8653

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EXAMINER

OSORIO, RICARDO

ART UNIT	PAPER NUMBER
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2673

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/683,725

Applicant(s)

CHENG, YU-CHIH

Examiner

RICARDO L OSORIO

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 4, 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Bullister (6,172,665).

Regarding claim 1, Bullister teaches of an optical mouse (Fig. 11A, reference character 240) comprising:

a housing (Fig. 11, reference character 240) having a flat bottom surface (Fig. 11A, reference character 246) and a first opening on the bottom surface (Fig. 11A, reference character 244 and col. 16, lines 63-64. The exposed portion (Fig. 11a, reference character 244) protrudes through the lower surface); a roller ball rotatably disposed inside the housing (Fig. 11A, reference character 242); a light source disposed inside the housing for generating light to illuminate the roller ball (Fig. 11A, reference character 248, and col. 16, lines 65-66); a light sensor disposed inside the housing for receiving light reflected from the roller ball (Fig. 11A, reference character 250, and col. 16, lines 66-67); and control circuitry disposed inside the housing for controlling

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operations of the optical mouse (Fig. 9b, reference character 100, col. 12, lines 61-65 and col. 17, lines 8-10); wherein when a user moves the housing against a flat surface, the roller ball will be rotated by engaging with the flat surface and the control circuitry is capable of generating corresponding pointing signals by detecting variations of light received by the light sensor (col. 12, lines 61-65, col. 16, lines 60-67, col. 17, lines 8-10).

Regarding claim 2, Bullister further teaches of an optical device for alternating an optical path of the light generated by the light source (see Fig. 13, reference character 272a, and col. 18, line 66-col. 19, line 2).

Regarding claim 4, Bullister teaches that the optical device comprises a lens (Fig. 13, reference character 274a) set for projecting the light reflected from the roller ball to the light sensor (col. 18, line 67-col. 19, line 2).

Regarding claim 8, Bullister teaches of the roller ball having a graphed surface (see Fig. 10E, and col. 15, lines 33-36). Although Bullister does not specifically disclose that the graphed surface provides for the light received by the light sensor to have different intensities, it is inherent in virtue of the fact that since the ball has an irregular surface with many faces (see col. 14, lines 24-25), that depending on the location and angle where the light hits, the light intensity received by the light sensor will change. For example, if the light hits perpendicular to the plane of one of the faces of the irregular surface, it will have more intensity than if it hits the face at an oblique, or at other different angles, since a shorter distance is traveled from the light source to

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the ball and there is less noise or loss, and more light intensity is then reflected from the ball to the sensor.

Regarding claim 9, Bullister teaches of the roller ball having a rough surface (see Fig. 10E, and col. 15, lines 33-36). Although Bullister does not specifically disclose that the rough surface provides for the light received by the light sensor to have different intensities, it is inherent in virtue of the fact that since the ball has an irregular surface with many faces (see col. 14, lines 24-25), depending on the location and angle where the light hits, the light intensity received by the light sensor will change. For example, if the light hits perpendicular to the plane of one of the faces of the irregular surface, it will have more intensity than if it hits the face at an oblique angle, or at other different angles, since a shorter distance is traveled from the light source to the ball and there is less noise or loss, and more light intensity is then reflected from the ball to the sensor.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bullister (see above rejection under 35 U.S.C. 102(e)) in view of Nachtigall et al (US 2001/0038377).

Regarding claim 3, Bullister teaches that the optical paths may include mirrors, diffraction gratings, and various types of lenses (see Bullister, col. 19, lines 57-59).

However, Bullister does not specifically teach of the optical device comprising a first lens set for projecting the light generated by the light source onto the roller ball.

Nachtigall teaches of an optical device comprising a lens (Fig. 3, reference character 5) set for projecting the light generated by the light source (Fig. 3, reference character 3a) onto the roller ball (Fig. 3, reference character 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the lens, as taught by Nachtigall, in the device of Bullister because since the light is bundled by the lens, it is possible to achieve high illumination densities on the ball (see Nachtigall, page 3, paragraph 40, lines 6-7), also, it improves the signal-to-noise ratio, and provides illumination requiring less power.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bullister in view of applicant's admitted prior art (hereafter, APA).

Regarding claim 5, the device of Bullister teaches of a control circuitry (Fig. 9b, reference character 100, and col. 12, lines 61-65).

However, Bullister is silent as to the control circuitry being disposed on a circuit board.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the control circuitry, as well as other circuit elements, disposed on a circuit board, in the device of Bullister because circuit boards are widely known in the electronic industry to be used

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for depositing circuit elements, such as semiconductors, including control circuits, in a more coherent, orderly and compact manner while avoiding unnecessary cabling and saving space.

Next, also in claim 5, Bullister teaches of a light source (Fig. 11A, reference character 248) that transmits light to a roller mouse ball surface, the roller ball surface reflects the light which is then detected by a light sensor (Fig. 11A, reference character 250).

However, Bullister does not teach of the circuit board having a second opening for passing the light reflected from the roller ball to the light sensor.

APA teaches of an optical mouse (see Figs. 3 and 4) having a circuit board (Figs. 3 and 4, reference character 40) located between a surface which receives the light from a light source (Figs 3 and 4, reference character 44) and a light sensor which detects the light reflected from said surface (Figs. 3 and 4, reference character 42). The circuit board of APA (Figs. 3 and 4, reference character 40) having an opening (Fig. 3, reference character 48) for passing light reflected from said surface to the light sensor (Figs. 3 and 4, reference character 42).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the circuit board with an opening, as taught by APA, in the device of Bullister for the following reasons: First, the mouse of Bullister, as all conventional mice, has limited space and needs flexibility to fit all required elements while still being functional. It can be readily recognized that the central area, as appears in Bullister, is the area with the biggest space. Furthermore, a considerable amount of space is necessary between the roller ball and the light sensor so that the light coming from the light source can hit the roller ball at a certain spot and reflect to be then detected by the light sensor. The circuit board best fits between the roller ball

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and the light sensor so that the space needed between the roller ball and the light sensor can be occupied and not wasted while keeping a compact design that fits all elements in a coherent manner to have functionality. Therefore, nothing would have prevented Bullister to have the circuit board placed between the roller ball and the light sensor.

Next, the circuit board can be either transparent or opaque. If the circuit board is transparent, then the light reflected from the roller ball passes the circuit board and is detected by the sensor. However, an opaque board must necessarily be fitted with an opening to allow light to pass through the board to the light sensor.

Finally, by having an opening in the circuit board, only light directly reflected from the ball to the sensor will hit the sensor, rather than having light scattered in other directions, which will provide a more accurate positional reading.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bullister in view of Yu-Chih (6,262,714).

Regarding claims 6 and 7, Bullister does not teach of two roller wheels which are pushed by the roller ball when the roller ball is pushed by the elastic device.

Yu-Chih teaches of two roller wheels which are pushed by the roller ball when the roller ball is pushed by the elastic device (see Yu-Chih, col. 2, lines 22-27).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the roller wheels pushed by the roller ball, as taught by Yu-Chi, in the device of Bullister because it is widely known in the art of computer mice to have a roller ball pushing

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the two roller wheels so that when the roller ball moves, the two roller wheels move at the same time (see Yu-Chih, col. 2, lines 27-29) to provide accurate coordinate information about the rotation of the wheel.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ricardo L. Osorio whose telephone number is (703) 305-2248. The examiner can normally be reached on Mon-Thu from 7:00 AM-6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala, can be reached at 305-4938.

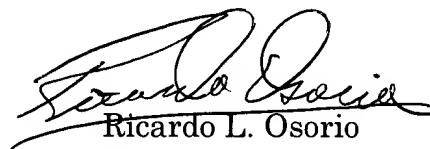
Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to: (703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.



Ricardo L. Osorio

Examiner

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RLO

November 13, 2003